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Near-surface Air-sea Aerosol Concentrations and Fluxes using a novel fast-response Particle Spectrometer

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The need for an accurate sea spray source function over a range of environmental conditions has been emphasised by recent global climate studies. Sea spray particles are the second largest single source of aerosol mass injected into the atmosphere. They are especially important as a source of cloud condensation nuclei (CCN), thereby affecting the chemistry and radiative effects of marine clouds. Sea spray particles also play a large role in transferring heat and moisture across the air-sea interface. Work over the last 30 years has reduced the uncertainties in this function from 7 orders of magnitude to just 1 but greater precision is required for the new generation climate models. Recent advances in instrumentation and techniques have made this objective achievable.

This paper describes a novel instrument, CLASP (Compact Lightweight Aerosol Spectrometer Probe) being developed at the University of Leeds. This instrument is especially useful for flux measurements in combination with an ultrasonic anemometer because it measures at 10Hz and is small in size. Thus, it does not disturb the airflow near the anemometer, permitting a reduction in inlet length. CLASP has been used during the WASFAB Experiment (Waves, Air Sea Fluxes, Aerosol and Bubbles) in Duck, North Carolina to record fluxes of sea spray. It has also been deployed on a small buoy for near-surface measurements during wave breaking events. Results from this field campaign will be presented.